STATE FOREST LAND
ENVIRONMENTAL CHECKLIST

Purpose of Checklist:

The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decided whether an EIS is required.

Instructions for Applicants:

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can. *Questions in italics are supplemental to Ecology's standard environmental checklist. They have been added by the DNR to assist in the review of state forest land proposals. Adjacency and landscape/ watershed-administrative-unit (WAU) maps for this proposal are available on the DNR internet website at http://www.dnr.wa.gov under "SEPA Center." These maps may also be reviewed at the DNR regional office responsible for the proposal. This checklist is to be used for SEPA evaluation of state forest land activities.*

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply." Complete answers to the questions now may avoid unnecessary delays later. *All of the questions are intended to address the complete proposal as described by your response to question A-11. The proposal acres in question A-11 may cover a larger area than the forest practice application acres, or the actual timber sale acres.*

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for nonproject proposals:

Complete this checklist for nonproject proposals, even though questions may be answered " does not apply." IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NON PROJECT ACTIONS (part D).

For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer" and "affected geographic area," respectively.

A. BACKGROUND

1. Name of proposed project, if applicable:

   Timber Sale Name: **BOWLINE** *Agreement #:***30-076437**

2. Name of applicant: **Department of Natural Resources**

3. Address and phone number of applicant and contact person:
   Northwest Region
   919 North Township St.
   Sedro Woolley, WA 98284
   Contact Person: Candace Johnson
   Telephone (360) 856-3500

4. Date checklist prepared: **4/26/04**

5. Agency requesting checklist: **Department of Natural Resources**

6. Proposed timing or schedule (including phasing, if applicable):

   a. *Auction Date:* **2/28/2005**
   b. *Planned contract end date (but may be extended):* **9/30/2005**
   c. *Phasing:* **Does Not Apply**

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.
   Yes.
   Timber Sale
   a. *Site preparation:* **The need for site preparation, including but not limited to herbicide and/or slash burning application will be assessed following harvest.**
   b. *Regeneration Method:* **Hand plant with conifer seedlings within two years of harvest.**
   c. *Vegetation Management:* **Hardwood saplings will probably be hand slashed five to seven years after planting.**
   d. *Thinning:* **The need for a precommercial thinning will be assessed 10-15 years following planting. A commercial thinning is possible 25 to 45 years after planting.**

   Roads: **New roads constructed to access the harvest unit will be abandoned following harvest.**

   Rock Pits and/or Sale: **Existing rock pits for this sale are the S-1100 pit located in Section 1 of Township 39 North, Range 5 East, and the S-1100 stockpile located in Section 2 of Township 39 North, Range 5 East. Any existing rock pits, or rock pits developed in conjunction with this sale or located during the construction of roads may be used again for future timber sales.**

   Other: **No Other**

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

☒*303 (d) – listed water body in WAU:* ☐*temp* ☐*sediment* ☐*completed TMDL (total maximum daily load):*
The attached department GIS map shows one portion of Cavanaugh Creek listed as a 303d water near the proposed timber sale. There are two stream segments located approximately 4 miles south of the proposal area. This proposal is not anticipated to affect these stream segments. Contact DNR Northwest Region office or http://www.ecy.wa.gov/programs/wq/303d for more information.

☐*Landscape plan:*
☒*Watershed analysis:* **Skookum Creek Watershed Analysis. Available at NW region office**
☐*Interdisciplinary team (ID Team) report:*
☒*Road design plan:* **Available at NW region office**
☐*Wildlife report:*
☐*Geotechnical report:*
☒*Other specialist report(s):* **State lands hydrologist/soils specialist report, dated June 18, 2004. Available at NW region office.**
☐*Memorandum of understanding (sportsmen's groups, neighborhood associations, tribes, etc.):*
☒*Rock pit plan:* **See the Bowline Road Plan, available at the NW Region office**
☐*Other:*

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. **None are known at this time.**

10. List any government approvals or permits that will be needed for your proposal, if known.

☐*HPA* ☐*Burning permit* ☐*Shoreline permit* ☐*Incidental take permit* ☒*FPA #* _____ ☐*Other:*

11. Give brief, complete description of our proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include specific information on project description.)

a. *Complete proposal description:*
Located less than five miles southeast of Acme, WA. Approximately 51 acres of mature second-growth timber within Section 25 of Township 37, Range 05E were considered for harvest in the Bowline proposal. A total of 4.9 acres will remain un-harvested in 13 different leave tree patches. Approximately 46 acres will be harvested by even-aged methods in the single unit.

Total # of Units: **1**
Proposal Area (acres): **46 (net)**
Estimated volume: **3,248 MBF**
Type of harvest: **Regeneration**
Logging system: **Shovel/Forwarder**
Landings: **4**
Existing rock pits: 1
Roads: **One temporary spur totaling 830 feet will be constructed.**

b. *Timber stand description pre-harvest (include major timber species and origin date), type of harvest, overall unit objectives.*
The stands in this harvest unit are naturally regenerated mixed conifer second-growth stands that seeded in 65-70 years ago. The largest trees in the stands are Douglas-fir up to 32 inches diameter at breast height (dbh) and 165 feet tall. There are also some dominant and co-dominant western hemlock & western redcedar within the unit that grow up to 22 inches dbh and 126 feet tall and 28 inches dbh and 130 feet tall, respectively. More numerous, but much smaller western hemlock and western redcedar comprise consistent intermediate and suppressed canopy layers throughout the unit. Most of these trees are 10-13 inches dbh or less and 100-120 feet tall or less. There are occasional sporadic hardwood trees and small patches of hardwood throughout the unit, particularly where old grown-over railroad grades or seasonally wet swales are located. Most of these trees are red alder and black cottonwood. Red alder trees generally grow up to about 23 inches dbh and 119 feet tall. Black cottonwood trees grow up to 24 inches dbh and 145 feet tall. Understory vegetation is dominated by sword fern. Proposal will generate revenue for State Forest Board Transfer (Trust 01).

c. *Road activity summary. See also forest practice application (FPA) for maps and more details.*

Type of Activity	How Many	Length (feet) (Estimated)	Acres (Estimated)	Fish Barrier Removals (#)
Construction		**830**	**0.3**	None
Reconstruction		**0**		N/A
Abandonment		**830**	**0.3**	None
Bridge Install/Replace	**0**			N/A
Culvert Install/Replace (fish)	**0**			N/A
Culvert Install/Replace (no fish)	**0**			

12. Location of proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. *(See timber sale map. See also color landscape/WAU map on the DNR website http://www.dnr.wa.gov under "SEPA Center.")*

a. Legal description: **Harvest unit located in Section 25, Township 37 North, Range 5 East, W.M.**
Rock pits for this project are located at S-1100 pit located in Section 1, Township 39 North, Range 5 East, and the S-1100 stockpile located in Section 2, Township 39 North, Range 5 East.

b. *Distance and direction from nearest town (include road names):* **The sale area is located approximately five miles southeast of the town of Acme. It is accessed by Highway 9, Saxon Road, and E-1000 forest road.**

c. *Identify the watershed administrative unit (WAU), the WAU Sub-basin(s), and acres. (See also landscape/WAU map on DNR website http://www.dnr.wa.gov under " SEPA Center.")*

WAU Name	WAU Acres	DNR Managed Acres	Proposal Acres
Skookum Creek	**23,188**	**5,639**	**46**
Sub-basin Name	Sub-basin Acres	DNR Managed Acres	Proposal Acres
Edfro Creek	**1,609**	**1,073**	**45**
Lower Skookum	**5,254**	**389**	**1**

13. *Discuss any known future activities not associated with this proposal that may result in a cumulative change in the environment when combined with the past and current proposal(s). (See digital ortho-photos for WAU and adjacency maps on DNR website http://www.dnr.wa.gov under "SEPA Center" for a broader landscape perspective.)*

This proposal is located within the Skookum Creek WAU. All streams in the vicinity are tributaries to the South Fork of the Nooksack River via Edfro Creek. Please see the table below for information regarding DNR's management within the WAU's based on the Department's GIS database.

Name of WAU or sub-basin	Acres	DNR managed acres	Private managed acres	Percent DNR managed land	Percent private managed land	Proposal Acres
Skookum Creek	23,188	5,639	17,549	24	76	46

The table below reports recent timber harvest activity on Department Lands within the last seven years, as well as future proposed timber harvests on Department lands. The same chart also reports recent past harvesting on private lands, but no attempt was made to predict future timber harvests on private land. Data for Department harvest was compiled from the Department's GIS database in August of 2004. The attached WAU map, created in August 2004, shows the location of Department and private harvest activity. One timber sale on Department land was not recorded on the enclosed WAU map. This sale included 46 acres of even-aged harvest.

NAME OF WAU	DNR ACRES EVEN-AGED HARVESTED IN LAST 7 YEARS + SOLD & PROPOSED TIMBER SALES NOT HARVESTED YET (WILL BE EVEN AGED HARVESTING)	DNR ACRES UNEVEN-AGED HARVESTED IN LAST 7 YEARS	DNR EXPECTED HARVEST ACRES WITHIN NEXT YEAR	PRIVATE ACRES EVEN-AGED HARVESTED IN LAST 7 YEARS	PRIVATE ACRES UNEVEN-AGED HARVESTED IN LAST 7 YEARS
Skookum Creek	**~531**	**8**	**~49**	**~1,400**	**~65**

The watershed analysis that has been completed for the Skookum Creek WAU analyzes the past impacts and future potential impacts to water resources from timber harvesting and the construction, maintenance, and use of forest roads. This analysis reports that while lower portions of Cavanaugh Creek were harvested in the 1920's, most logging activity in the WAU occurred in the 1940's, except for the upper basins of Skookum, Orsino and Arlecho Creeks which experienced logging in the 1950's. Additional logging occurred in higher elevations in the 1960's and 1970's. Mid- and lower-elevation second-growth stands have been logged through the 1990's.

The Skookum Creek Watershed Analysis lists the following impacts to watershed resources as a result of past timber harvesting: elevated stream temperatures due to lack of riparian forest cover, lack of coarse woody debris in streams, high sediment supply in streams, and changes in peak flows.

This timber sale has been designed to mitigate potential impacts described above and is not expected to result in significant cumulative impacts to watershed resources. The Bowline Timber Sale, as well as other recently sold and future Department sales in these WAU's, have met or will meet or exceed the requirements of watershed analysis prescriptions relating to protection from mass wasting, reducing surface erosion from roads, and retaining timber in riparian areas to provide adequate shade and down woody debris recruitment.

All of the Department's ownership within this WAU is within the range of the Nooksack Elk herd. The WDFW's management plan for this herd cites loss of thermal cover due to timber harvesting, lack of corridors for travel between winter and summer ranges and human disturbance as major factors that have contributed to the decline of this herd. All of the Department's ownership within the vicinity of this proposal is within a zone designated as "core management area" by the WDFW. The most recent Nooksack Elk herd management plan, published in March of 2002, recommends habitat enhancement by seeding cleared areas to promote quality forage, limiting human access by gating roads, and maintaining corridors for herds to move between ranges. The Department manages 5,000+ acres of forest within the "core management area" for the Nooksack herd. In these areas, which consist primarily of mature conifer forests within critical winter range for the herd, the Department has collaborated with the WDFW and established an informal agreement that preserves suitable habitat conditions for this herd. Within this area on Department lands, harvest units are scheduled to maintain corridors for elk movement. Grass seeding with a recommended forage mix will occur on road cut and fill slopes. Gates will also be maintained and locked.

The Department's Habitat Conservation Plan (HCP) outlines strategies to protect all Federally listed threatened and endangered species, and species that are in danger of being listed in the future, as well as uncommon habitat types found on forest lands in western Washington. HCP prescribed riparian and slope stability buffers intended to protect salmon and trout habitat were applied to this proposal and will be applied to all future sales in the vicinity. The HCP identifies large, structurally unique trees and snags as uncommon habitats that need to be protected. An average of 11 trees per acre will be left after harvest on Bowline. These trees will function for future snag and large structurally unique tree recruitment.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (check one):

☐Flat, ☒Rolling, ☐Hilly, ☐Steep Slopes, ☐Mountainous, ☐Other:

1) General description of the WAU or sub-basin(s) (landforms, climate, elevations, and forest vegetation zone).

The Skookum Creek WAU is located in Townships 36 and 37 North, Ranges 5 and 6 East in Skagit and Whatcom counties. The WAU consists of 23,188 acres encompassing New York, Bald and Bear Mountains and contains the drainages for Skookum Creek along the WAU's north boundary and Cavanaugh Creek along the WAU's south boundary. All water from the WAU drains into the south fork of the Nooksack River. Minimum elevations in the WAU are 374 feet at the South Fork of the Nooksack River while maximum elevations top out at 7,000 feet on the west flank of the Twin Sisters Mountain. Annual precipitation averages between 60 and 120 inches and occurs predominantly as rain. The general aspect is west. Most of the WAU is within the Western Hemlock Zone where old growth forests are dominated by western hemlock and western redcedar. Second- and third-growth forests are comprised primarily of Douglas-fir and hardwoods. The west flank of New York Mountain contains large areas of hardwood, primarily red alder, black cottonwood and bigleaf maple. At upper elevations (greater than 2,500 feet), Pacific silver fir and western hemlock dominate stand composition. Stand ages in the majority of the WAU range from 0 (new harvests) to 80 with one significant pocket (approximately 400 acres) of old-growth along the northeast flank of New York Mountain.

2) Identify any difference between the proposal location and the general description of the WAU or sub-basin(s).
The proposal location is typical of the WAU.

b. What is the steepest slope on the site (approximate percent slope)?
The steepest slope on the site is approximately 50% in an area less than one acre. The remaining area of the site is gentle and rolling with slopes less than 30%.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland. *Note: The following table is created from state soil survey data. It is a roll-up of general soils information for the soils found in the entire sale area. It is only one of several site assessment tools used in conjunction with actual site inspections for slope stability concerns or erosion potential. It can help indicate potential for shallow, rapid soil movement, but often does not represent deeper soil sub-strata. The actual soils conditions in the sale area may vary considerably based on land-form shapes, presence of erosive situations, and other factors. The state soil survey is a compilation of various surveys with different standards.*

State Soil Survey #	Soil Texture	% Slope	Acres	Mass Wasting Potential	Erosion Potential
4787	**GRAVELLY LOAM**	**5-30**	**46**	**INSIGNIFIC'T**	**LOW**

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

1) Surface indications: **None**

2) Is there evidence of natural slope failures in the sub-basin(s)?
☒*No* ☐*Yes, type of failures (shallow vs. deep-seated) and failure site characteristics:*

The Skookum Creek Watershed Analysis describes natural slope failures as generally occurring in glacial outwash near the heads of major stream channels such as Skookum and Orsino Creeks, and in old phyllite bedrock fault zones and scarps in upper ridge areas. The watershed analysis reports that the lack of recent failures and the absence of recent slide morphology on slopes exposed at harvest indicate that these landforms have been stable.

The Skookum Creek Watershed Analysis describes slope failures associated with natural processes in the following table:

Activity	Number of Landslides	Percent of Total Landslides
Mature forests	**56**	**16**
Non-forests	**10**	**3**
Total	**66***	**19**

**** The watershed analysis identifies 346 inventoried landslides in numerous tables. The watershed analysis does not explain why the total number of landslides (66 from table in B1d2 and 279 from table B1d3 below) adds up to 345 and not 346.***

The watershed analysis does not report the number of slope failures by sub-basin.

3) Are there slope failures in the sub-basin(s) associated with timber harvest activities or roads?
☐*No* ☒*Yes, type of failures (shallow vs. deep-seated) and failure site characteristics:*
Associated management activity:
The Skookum Creek Watershed Analysis describes slope failures associated with timber harvest activities in the following table:

Activity	Number of Landslides	Percent of Total Landslides
Clear cut 0-20 years	**173**	**50**
Clear cut 20-50 years	**20**	**6**
Roads	**79**	**23**
Landings	**7**	**2**
Total	**279***	**81**

The watershed analysis identifies 346 inventoried landslides in numerous tables. The watershed analysis does not explain why the total number of landslides (66 from table in B1d2 above and 279 from table B1d3) adds up to 345 and not 346.

The watershed analysis does not report the number of slope failures by sub-basin.

4) *Is the proposed site similar to sites where slope failures have occurred previously in the sub-basin(s)?*
☒*No* ☐*Yes, describe similarities between the conditions and activities on these sites:*

5) *Describe any slope stability protection measures (including sale boundary location, road, and harvest system decisions) incorporated into this proposal.*
The harvest unit and new roads are located to avoid any timber harvest or road construction on potentially unstable slopes.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.
Approx. acreage new roads: **0.4** *Approx. acreage new landings:* **1** *Fill source:* **Native material and rock from existing rock pits will all provide construction materials for new roads and landings. Rock pits for this project are located at S-1100 pit located in Section 1, Township 39 North, Range 5 East, and the S-1100 stockpile located in Section 2, Township 39 North, Range 5 East.**

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.
Yarding and road construction during periods of heavy rainfall could cause localized erosion. Any erosion should be contained on site.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? *Approximate percent of proposal in permanent road running surface (includes gravel roads):* **0% of the proposed roads will be covered in permanent road surface. All proposed roads will be abandoned following operations**.

h. Propose measures to reduce or control erosion, or other impacts to the earth, if any:
(Include protection measures for minimizing compaction or rutting.)
No timber harvest or new road construction will occur on potentially unstable slopes. Road construction, yarding, and timber hauling will not be allowed from November 1 through March 31 unless the operator formulates an adequate plan to prevent erosion from entering surface waters. These activities may be further restricted during periods of wet weather throughout the year. Pre-designated skid trails will have logs placed into the type 5 stream crossing to prevent channel degradation. Following operations, approaches to the crossings will be water-barred, and logs shall be removed from the crossing, and the channel restored to pre-operation conditions. Pre-designated skid trails shall be water-barred following operations to minimize sediment transport across the skid trails.

2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust *from truck traffic, rock mining, crushing or hauling,* automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.
No emissions are anticipated other than minor amounts of equipment exhaust and road dust created by truck traffic.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.
Does not apply.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:
If slash is burned, it will be burned in adherence to the State's Smoke Management Program. Dust abatement must be achieved on the S-1000 Road from MP 0.0 to MP 0.1 from March 30 to November 1, due to the proximity of the haul route to residences. Dust abatement will consist of the application of water or a mixture of water and lignin.

3. Water

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. *(See timber sale map and forest practice base maps.)*
Yes.

a) Downstream water bodies:
The type 5 stream in the harvest unit flows into an unnamed wetland which flows into Edfro Creek and then directly into the South Fork of the Nooksack River. The untyped streams go subsurface before entering any other surface waters.

b) Complete the following riparian & wetland management zone table:

Wetland, Stream, Lake, Pond, or Saltwater Name (if any)	Water Type	Number (how many?)	Avg RMZ/WMZ Width in Feet (per side for streams)
Un-named	**untyped**	**4**	**0**
Un-named	**5**	**1**	**0**

c) List RMZ/WMZ protection measures including silvicultural prescriptions, road-related RMZ/WMZ protection measures, and wind buffers. **See B3a2 below.**

2) Will the project require any work over, in, or adjacent to (within 200 feet) to the described waters? If yes, please describe and attach available plans.
☐*No* ☒*Yes (See RMZ/WMZ table above and timber sale map.)*
Description (include culverts):
Timber will be felled and yarded immediately adjacent to the type 5 and untyped streams. Timber will be felled away from the stream channels and will not be yarded through these stream channels except for at one designated crossing on the type 5 stream, which will be filled with logs during yarding in order to protect the stream banks from erosion.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.
None.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. *(Include diversions for fish-passage culvert installation.)*
☒*No* ☐*Yes, description:*

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.
☒*No* ☐*Yes, describe location:*

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.
☒*No* ☐*Yes, type and volume:*

7) Does the sub-basin contain soils or terrain susceptible to surface erosion and/or mass wasting? What is the potential for eroded material to enter surface water?

Yes.

SKOOKUM CREEK WAU- EDFRO CREEK SUB-BASIN

The department's GIS database reports the following data

Landform	% of sub-basin
Medium soil erosion potential	47%
High soil erosion potential	8%
Medium mass wasting potential	37%
High mass wasting potential	1%

There are numerous small streams that flow through these areas, so there is a high potential for eroded material to enter surface waters.

SKOOKUM CREEK WAU – LOWER SKOOKUM SUB-BASIN

The department's GIS database reports the following data

Landform	% of sub-basin
Medium soil erosion potential	57%
High soil erosion potential	26%
Medium mass wasting potential	63%
High mass wasting potential	11%

There are numerous small streams that flow through these areas, so there is a high potential for eroded material to enter surface waters.

8) Is there evidence of changes to the channels in the WAU and sub-basin(s) due to surface erosion or mass wasting (accelerated aggradations, erosion, decrease in large organic debris (LOD), change in channel dimensions)?
☐*No* ☒*Yes, describe changes and possible causes:*

The watershed analysis states:
"Episodic disturbances have caused channel widening and deposition in Orsino, Upper and Lower Skookum, Cavanaugh below the wetland and the mouth of Arlecho (creeks) … while Hayden, Arlecho above the mouth, Cavanaugh above the wetland, Musto Marsh Tributary, Edfro, North Tributary and South Tributary (creeks) have been more stable. "

9) Could this proposal affect water quality based on the answers to the questions 1-8 above?
☒*No* ☐*Yes, explain:*
The proposed harvest activity will have little effect on stream and water quality. No harvest or road building activity will take place in areas of potential instability with the possibility of delivering sediment to streams. The placement of leave trees and road building standards will minimize any impacts to water quality.

10) What are the approximate road miles per square mile in the WAU and sub-basin(s)?
The Department's GIS database indicates the following:
Overall Skookum Creek WAU: 3.6
Edfro Creek sub-basin: 2.8
Lower Skookum Sub-basin: 4.4

Are you aware of areas where forest roads or road ditches intercept sub-surface flow and deliver surface water to streams, rather than back to the forest floor?
☒*No* ☐*Yes, describe:*

*11) Is the proposal within a significant rain-on-snow (ROS) zone? If not, **STOP HERE** and go to question B-3-a-13 below. Use the WAU or sub-basin(s) for the ROS percentage questions below.*
☒*No* ☐*Yes, approximate percent of WAU in significant ROS zone.*
Approximate percent of sub-basin(s):

12) If the proposal is within the significant ROS zone, what is the approximate percentage of the WAU or sub-basin(s) within the significant ROS zone (all ownerships) that is (are) rated as hydrologically mature?

13) Is there evidence of changes to channels associated with peak flows in the WAU or sub-basin(s)?
☐*No* ☒*Yes, describe observations:*
The watershed analysis describes possible changes to channels associated with peak flows as follows:

Past timber harvesting, in all nine sub-basins, was estimated … to have increased the peak flows during mean two year rain-on-snow storms by less than 10% over peak flows estimated for the fully forested condition. For extreme rain-on-snow storm events … estimates of the mean two year peak flows for the existing vegetation cover exceeded those of fully forested condition by 0% to 18% for the sub-basins studied … Results from the record analysis were inconclusive as far as identifying subtle changes in the record that could be attributed to forest management in the basin, however, no marked trend was found in the record … Given the results and the uncertainty in the methods, we conclude that peak flow enhancement due to the current vegetation cover is not a major problem and was assigned a low delivered hazard for all sub-basins within the WAU.

This is supported by the fact that these basins were known to have experienced at least two major rain-on-snow storms within the last four years and the channels were reported to have held up well … However, where glacial outwash comprises the banks, increased peak flows can impact the system by accelerating erosion at the toes of adjacent landslides.

The bank cutting that was noted at the toes of landslides concentrated in Upper Skookum, Lower Skookum and Orsino (creeks) … appeared to be due to the non-cohesive nature of the bank materials … (and) can be exacerbated by increases in peak flows.

Two events were noted in which the channels demonstrated basin-wide channel widening and deposition in response to the combination of peak flows and sediment inputs: one event occurred prior to 1952 (probable 1949 storm) and one event occurred in the mid-seventies (probable 1974 storm).

14) *Based on your answers to questions B-3-a-10 through B-3-a-13 above, describe whether and how this proposal, in combination with other past, current, or reasonably foreseeable proposals in the WAU and sub-basin(s), may contribute to a peak flow impact.*

This proposal is expected to reduce the percentage of hydrologically mature forest in the Edfro creek sub-basin to 70%. An analysis using the model that was used in the hydrologic change module of the watershed analysis predicted that this condition would result in a peak flow increase of 4.6% over a fully forested condition, which was not expected to cause detrimental impacts to stream channels. Please see memo from Hydrologist/Soils Specialist for details of this analysis.

An analysis for the Lower Skookum sub-basin was not conducted because such a small area of the proposal (approximately one acre) is within this sub-basin, and because this sub-basin is at the lower end of Skookum Creek, where upstream forested conditions will dominate the hydrology of this portion of the creek. Please see memo from Hydrologist/Soils Specialist for further explanation of why this analysis was not done.

15) *Is there water resource (public, domestic, agricultural, hatchery, etc.), or area of slope instability, downstream or downslope of the proposed activity that could be affected by changes in surface water amounts, quality, or movements as a result of this proposal?*
☒*No* ☐*Yes, possible impacts:*
The Skookum Creek Fish Hatchery is located downriver of the Bowline Timber Sale proposal area near the confluence of the South Fork of the Nooksack River and Skookum Creek.
Due to the fact that the creeks located within the Bowline Timber Sale area have no direct connectivity with either Skookum Creek or the South Fork of the Nooksack River there will be no impact to the hatchery's water supply.

16) *Based on your answers to questions B-3-a-10 through B-3-a-15 above, note any protection measures addressing possible peak flow/flooding impacts.*
From November 1 to March 31, yarding operations, timber and rock hauling, road construction, reconstruction and maintenance activities will not be allowed unless the operator formulates an adequate plan to prevent erosion from entering surface waters. Grass seeding of newly exposed soils from the construction of spurs and landings will occur shortly after completion of construction. Reforestation will occur within two years of harvest. All existing culverts are sized for 100-year flood events. Cross drains are adequate in number and size to avoid concentration of run-off. Cross-drain culverts with catch basins and rock head walls at culvert inlets and rock energy dissipaters at outlets will be maintained. Approximately 830 feet of road will be abandoned after harvesting is completed. All logs will have lead end suspended during yarding operations. No timber harvesting or road construction will occur on areas showing surface indications of potential instability where deliverability is a possibility.

b. *Ground Water:*

1) *Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.*
Channelized water through ditches and culverts emptying out onto the forest floor will increase surface saturation in localized areas, but is not expected to affect ground water.

2) *Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.*
Insignificant amounts of oil and lubricants could be inadvertently spilled as a result of heavy equipment use. No lubricants will be disposed of on site.

3) *Is there a water resource use (public, domestic, agricultural, hatchery, etc.), or area of slope instability, downstream or down slope of the proposed activity that could be affected by changes in groundwater amounts, timing, or movements as a result this proposal?*
☒*No* ☐*Yes, describe:*

a) Note protection measures, if any.
None.

c. Water Runoff (including storm water):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.
Storm water runoff will be collected by landings, road surfaces and ditches, and then diverted through cross drain culverts onto the forest floor.

2) Could waste materials enter ground or surface waters? If so, generally describe.
It is unlikely that any waste materials could enter any surface or ground water.
a) Note protection measures, if any.
None.

d. *Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:*
(See surface water, ground water, and water runoff sections above, questions B-3-a-1-c, B-3-a-16, B-3-b-3-a, and B-3-c-2-a.)
Storm water runoff will be collected by landings, road surfaces and ditches, and then diverted through cross drain culverts onto the forest floor. Existing culverts will minimize the amount of ditch water entering existing streams. Seasonal yarding restrictions will prevent channelizing of run-off. Cut banks created by new road construction will be grass-seeded.

4. Plants

a. *Check or circle types of vegetation found on the site:*

☒deciduous tree: ☒alder, ☒maple, ☐aspen, ☒*cottonwood,* ☐*western larch,* ☐*birch,* ☐other:
☒evergreen tree: ☒*Douglas fir,* ☐*grand fir,* ☐*Pacific silver fir,* ☐*ponderosa pine,* ☐*lodgepole pine,* ☒*western hemlock,* ☐*mountain hemlock,* ☐*Englemann spruce,* ☐*Sitka spruce,* ☒*red cedar,* ☐*yellow cedar,* ☐other:
☒shrubs: ☒*huckleberry,* ☒*salmonberry,* ☐*salal,* ☒*other:* **Swordfern**
☒grass
☐pasture
☐crop or grain
☒wet soil plants: ☐cattail, ☐buttercup, ☐bullrush, ☒skunk cabbage, ☒*devil's club,* ☐other:
☐water plants: ☐water lily, ☐eelgrass, ☐milfoil, ☐other:
☐other types of vegetation:
☐*plant communities of concern:*

b. *What kind and amount of vegetation will be removed or altered? (See answers to questions A-11-a, A-11-b, B-3-a-1-b and B-3-a-1-c. The following sub-questions merely supplement those answers.)*
See A.11.

1) *Describe the species, age, and structural diversity of the timber types immediately adjacent to the removal area. (See landscape/WAU and adjacency maps on the DNR website at: http://www.dnr.wa.gov under "SEPA Center.")*
To the north and west of the proposal lie young conifer stands of approximately 15 years in age, and four years of age, respectively. To the south and east of the project area are stands that are similar in age and composition to the harvest unit. The proposal area partially wraps around a three-year-old conifer stand to the south, and completely surrounds a six-year-old conifer stand.

2) *Retention tree plan:*
Legacy tree levels were determined in accordance with DNR Forestry Handbook Procedure PR 14-006-090 (May 2000). In the proposed unit, a total of 531 green/wildlife trees will be retained (approximately 11 trees per acre). This represents over 7% of the stem count greater than 12 inches dbh, according to the departments inventory data. Legacy trees are clumped to protect a diversity of upland habitat features, including small wetlands, large woody debris, snags, and creeks. Selected legacy trees are either in the dominant or co-dominant crown classes, containing structural characteristics important to wildlife, and indicating wind firmness. In all areas of the proposal leave trees were marked together as distinctive leave tree areas (LTA's) and marked with yellow leave tree tags. Where possible, groups were selected to minimize the likelihood of windthrow (for example, many trees located at the edge created between mature timber and a stand of young trees were marked, since these trees have already been "wind-tested").

c. *List threatened or endangered plant species known to be on or near the site.*
None known.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
The site will be replanted with conifer seedlings after harvest.

5. Animal

a. *Circle or check any birds animals or unique habitats which have been observed on or near the site or are known to be on or near the site:*

birds: ☐hawk, ☐heron, ☐eagle, ☒songbirds, ☐*pigeon,* ☒other: barred owl & raven
mammals: ☒deer, ☒bear, ☒elk, ☐beaver, ☐other:
fish: ☐bass, ☒salmon, ☒trout, ☐herring, ☐shellfish, ☐other:
unique habitats: ☐*talus slopes,* ☐*caves,* ☐*cliffs,* ☐*oak woodlands,* ☐*balds,* ☐*mineral springs*

b. *List any threatened or endangered species known to be on or near the site (include federal- and state-listed species).*
The type 5 stream in the vicinity of this sale is tributary to the South Fork Nooksack River via Edfro Creek. Based on research from the watershed analysis, the lower segment of Skookum Creek is spawning habitat for Chinook and Coho salmon. Edfro Creek is spawning habitat for Coho salmon. Chinook salmon are listed as a threatened species and Coho salmon are a candidate for listing. The Department's TRAX database and PHS database did not reveal any other threatened or endangered species in the area.

c. *Is the site part of a migration route? If so, explain.*
☒*Pacific flyway* ☐*Other migration route:* *Explain if any boxes checked:*

All of Washington State is considered part of the Pacific Flyway. No impacts are anticipated as a result of this proposal.

d. *Proposed measures to preserve or enhance wildlife, if any:*

1) *Note existing or proposed protection measures, if any, for the complete proposal described in question A-11.*
Species/Habitat: **Fish Habitat** Protection Measures: **Stream Protection measures listed in B.3.a.1.b., B.3.a.2. Soil protection measures in B.1.h. Slope stability protection in B.1.D.5., and Peak Flow protection in B.3.a.16.**

Species/Habitat**: Mature Forest Components** Protection Measures: **Retention tree plan described in B.4.b.2.**

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.
Does Not Apply.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
Does Not Apply.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:
Does Not Apply.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste that could occur as a result of this proposal? If so, describe.
There is a minimal hazard from heavy equipment operations. There is a potential fire hazard if operating during severe fire weather conditions during the summer.

1) Describe special emergency services that might be required.
None.

2) Proposed measures to reduce or control environmental health hazards, if any:
None.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?
None.

2) What types and levels of noise would be created by or associated with the project on a short-term or long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from this site.
Noise from log trucks and logging equipment will be present while operating during daylight hours

3) Proposed measures to reduce or control noise impacts, if any:
None.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties? (Site includes the complete proposal, e.g. rock pits and access roads.)
Timber production

b. Has the site been used for agriculture? If so, describe.
No.

c. Describe any structures on the site.
None.

d. Will any structures be demolished? If so, what?
No.

e. What is the current zoning classification of the site?
Industrial Forestry.

f. What is the current comprehensive plan designation of the site?
Industrial Forestry.

g. If applicable, what is the current shoreline master program designation of the site?
Does not apply.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.
No.

i. Approximately how many people would reside or work in the completed project?
Does not apply.

j. Approximately how many people would the completed project displace?
Does not apply.

k. Proposed measures to avoid or reduce displacement impacts, if any:
Does not apply.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
The design of this project is consistent with current comprehensive plans and zoning regulations.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.
Does not apply.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
Does not apply.

c. Proposed measures to reduce or control housing impacts, if any:
Does not apply.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principle exterior building material(s) proposed?
Does not apply.

b. What views in the immediate vicinity would be altered or obstructed?
41 acres of second-growth conifer forest will be converted to regeneration harvest with reserve trees, which will eventually grow into a conifer plantation.

1) Is this proposal visible from a residential area, town, city, developed recreation site, or a scenic vista?
☒*No* ☐*Yes, viewing location:*

2) Is this proposal visible from a major transportation or designated scenic corridor (county road, state or interstate highway, US route, river, or Columbia Gorge SMA)?
☒*No* ☐*Yes, scenic corridor name:*

3) How will this proposal affect any views described in 1) or 2) above?
Does not apply.

c. Proposed measures to reduce or control aesthetic impacts, if any:
Retention trees and RMZ buffers will reduce the aesthetic impacts of the harvest.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
Does not apply.

b. Could light or glare from the finished project be a safety hazard or interfere with views?
Does not apply.

c. What existing off-site sources of light or glare may affect your proposal?
Does not apply.

d. Proposed measures to reduce or control light and glare impacts, if any:
Does not apply.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?
Hunting, fishing, hiking, horse riding.

b. Would the proposed project displace any existing recreational uses? If so, describe:
None.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
None.

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for national, state, or local preservation registers known to be on or next to the site? If so, generally describe.
None known.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.
None.

c. Proposed measures to reduce or control impacts, if any:
(Include all meetings or consultations with tribes, archaeologists, anthropologists or other authorities.)
Area Native American tribes (Lummi and Nooksack) were sent a map of the proposed timber sale along with a letter requesting that they identify any issues or concerns and bring it to our attention.

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.
Please see timber sale, vicinity, adjacency maps. Please see WAU maps on the DNR website under "SEPA CENTER".

1) Is it likely that this proposal will contribute to an existing safety, noise, dust, maintenance, or other transportation impact problem(s)?
No.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?
No. The distance to the nearest transit stop is not known.

c. How many parking spaces would the completed project have? How many would the project eliminate?

Does not apply.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

1) How does this proposal impact the overall transportation system/circulation in the surrounding area, if at all?
No impacts are expected.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.
See question A-11 of this checklist for the background description of this completed proposal, which includes a road summary. See also the attached FP Application Roads Section. A complete detailed road plan is available at the DNR NW region office.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.
It is estimated that 16 trips per day would occur during active logging operations. Once the logging has been completed, no new vehicular trips will be necessary except for periodic road maintenance and stand assessments/maintenance.

g. Proposed measures to reduce or control transportation impacts, if any:
None.

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.
No.

b. Proposed measures to reduce or control direct impacts on public services, if any.
None.

16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.
None.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity that might be needed.
None.